Mr. Brandon Samuel
Department of Technology Management and Budget
DTMB Procurement
2nd Floor, Mason Building
530 West Allegan Street
Lansing, MI 48933

October 23, 2013

Re: Request for Information Project Number #0071141113B0000535

Dear Mr. Samuel,

Attached please find the electronic submission of our response to the Request for Information recently released by the State of Michigan. Six hard copies have been mailed to you via overnight courier. This proposal is being submitted by Spectrum Health on behalf of Strong Beginnings, a federal Healthy Start project. Strong Beginnings is a partnership of six community agencies working to improve maternal child health and reduce racial disparities in birth outcomes among African Americans, with Spectrum Health as the fiduciary.

Please direct any requests for further information to:

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Thank you for considering our proposal,

Sincerely,

Peggy Vander Meulen

Strong Beginnings
Program Director

Michigan RFI Social Impact Bonds – Concept Paper

Summary Overview

Michigan's Black infant mortality rates have historically been some of the highest in the country, with a disparity ratio three times higher than the White rate. The main cause of death is preterm birth (PTB) / low birth weight (LBW). In addition to this devastating loss of life, for every one LBW baby that dies there are approximately ten that survive, often with life-long physical, behavioral, and cognitive disabilities. Women with a prior adverse pregnancy outcome are three to four times more likely to have another poor outcome in their subsequent pregnancy, and Black infants are seventy percent more likely to be born preterm than are White infants. The health care and societal costs of these fragile infants are astronomical, in many cases running into millions of dollars over the course of a lifetime.

In 2006, with initial funding from the Michigan Department of Community Health, Kent County adopted an evidence-based model to provide interconception (IC) care to women whose previous pregnancy resulted in a poor outcome (infant loss, still birth, PTB or LBW). The focus of the IC program is to provide enhanced case management services for high-risk women in between pregnancies to ensure their optimal preconception health. Services are provided by community health nurses and other health professionals that provide home visits, education, and needed referrals, as well as a dental component, wellness program and family planning services. The program targets, but is not limited to, African American women served through the area's Maternal Infant Health Program (MIHP) and Strong Beginnings, a Federal Healthy Start program.

The IC program has demonstrated significant positive outcomes, with dramatic reductions in NICU admissions, LBW, and premature births among women who had a subsequent pregnancy. These outcomes translate into substantial cost savings to Medicaid, private insurers, families, and society.

Social Issue – Racial Disparities in Birth Outcomes

The African American infant mortality rate in Kent County from 2008-2010, the most recent period for which data is available, was 13.8 deaths per 1,000 live births. This was nearly three times the infant mortality rate among White infants for this period (5.0/1,000). The area's disparity between African Americans and Whites in the rate of low and very-low/extremely-low weight births is also stark. In 2011, the most recent year for which data is available, 15.3% of Kent County African American infants were low-weight births compared to 6.5% of White births and 7.3% of Hispanic births. African American infants were also nearly four times as likely to be born very-low or extremely-low weight compared to White infants.

Infant mortality is considered a social problem with health consequences, exacerbated by poverty, unemployment, unsafe neighborhoods, low education, lack of basic resources, structural racism, and unequal treatment based on the color of one's skin. Even after accounting for socio-economic factors and risk behaviors, women of color have higher rates of infant death than their white counterparts. Utilizing a life course perspective, the IC program places a strong emphasis on addressing and alleviating social factors and life stressors that impact maternal health and pregnancy.

Proposed Model

Background

The IC Program began in 2005, when KCHD received a start-up grant of $130,000 from the Michigan Department of Community Health (MDCH). The grant funded the development of an infant health coalition, a community action plan to reduce infant mortality, particularly for African Americans, and implementation of evidence-based interconception services. Kent County was one of eleven Michigan counties that received funding based on high disparities between African American and White infant survival. The Kent County IC Program is modeled after two promising demonstration projects in Denver and Atlanta that showed evidence of success. We also utilized local Fetal Infant Mortality Review data and Perinatal Periods of Risk analysis, and obtained community input from key informants and nearly two hundred residents. The program we developed was declared a state model by MDCH and adopted by six other Michigan counties.

Client enrollment began in 2007, but state funding ended in 2009 due to budgetary cuts. Kent County Commissioners were impressed by the preliminary positive outcomes and allocated general funds dollars to continue the IC program at a restricted level. We were also successful at obtaining three CDC REACH grants 2008 – 2011 to continue the IC program as well as implement activities to address racism and promote racial equity.

In 2012 the IC program received a Promising Practice designation from the National Association of City and County Health Organizations (NACCHO), and we are currently applying for the higher Model Practice designation. In 2013 the IC program and its outcomes were presented at the National Governor's Association meeting – one of only two Michigan projects to be highlighted – and at the Michigan Home Visiting Conference. We were also invited to share our findings at the CityMatCH Annual Conference in September 2013.

Program Description

The IC program addresses maternal and infant disparities by providing enhanced case management and referral services to enrolled clients for eighteen months after delivery. Women are eligible if their last pregnancy resulted in an infant death, fetal demise (after 20 weeks gestation), stillbirth, premature delivery (before 37 weeks gestation), or low birth weight birth (less than 2500 grams or 5.5 pounds) and they have not undergone permanent sterilization. Public health nurses (PHN) visit IC clients from six to nine times to assist them toward achieving optimal preconception health. Many of the African American clients receive additional home visits and support from community health workers employed by Strong Beginnings (federal Healthy Start). In addition to case management, the program includes wellness, oral health, and family planning services. The program's overall goal is to impact the following outcome areas:

- Reduce infant mortality
- Fewer preterm births (a birth that takes place before 37 weeks gestation)
- Fewer low birth weight babies (an infant weighing less than 2500 grams)
- More planned pregnancies
- More pregnancies with a 12-18 month pregnancy interval
- Improve oral health status
- Promote maternal health and wellness

- Improve client linkages to community resources related to the social determinants of health (e.g., access to healthy food, access to transportation, safe affordable housing).

IC services include dental treatments to restore clients to oral health, including reduction of periodontal disease; a wellness program and biometric screenings; completion of a reproductive life plan, access to family planning services and follow-up on compliance with clients' contraception plan. The need to space pregnancies at least 18 months apart is emphasized and clients are given a $20 family planning incentive every three months to help them achieve proper child spacing. Clients are given a preconception health kit with items such as dental supplies, vitamins, home pregnancy test, Farmer's Market coupons, and educational materials.

Research shows African American women are much more likely to have periodontal disease (PD) and less likely to have access to dental care than white women. PD may account for up to twenty percent of premature births and treating PD may reduce preterm births by 8.7%. The IC Program addresses the importance of dental care through the Brush Up for Baby (BUFB) Program. KCHD and Strong Beginnings contract with the Baxter Holistic Health Center Dental Clinic to provide IC clients with dental cleanings, extractions, restorations and root canals. Clients receive one-on-one education and frequent monitoring from a dental hygienist focusing on the importance of caring for their teeth and gums. Transportation is provided when needed as well as assistance in finding child care.

The IC Program's wellness component encourages healthy eating and physical activity and increases women's access to fresh fruits and vegetables, as research indicates that maternal obesity contributes to poor infant survival and health. Women in the wellness program receive a pedometer and learn to track their daily steps. They are given coupons for purchases at the Farmer's Market and recipes that feature market produce. They are encouraged to log their daily fruit and vegetable consumption and to participate in the biometric screenings offered free at the KCHD clinic. IC clients receive education and encouragement from their case manager as well as an incentive for completing their steps and fruit/vegetable logs. Data on Body Mass Index (BMI) is collected on all IC clients during enrollment.

What is significant about the IC Program is the emphasis on the social factors impacting clients' health. PHNs serve as case managers and focus on the whole health of the woman including social determinants of health. They conduct regular assessments for medical, behavioral, and social factors and develop individual care plans with clients. They take time to talk with clients about their life experiences, with special attention to social and mental or emotional factors affecting pregnancy and child rearing. Besides providing IC education, interventions, and counseling related to pregnancy risk, clients and PHNs discuss how stable housing, meeting basic needs, maintaining healthy relationships, and abstinence from tobacco, alcohol and other drugs can significantly decrease risks for having another premature and/or low-weight birth. The PHN stresses the importance of nutrition, exercise, sleep, treating medical conditions, dental health, and managing stress, and links clients to essential needs, including, but not limited to: housing, employment, GED, healthy foods, transportation, medical home, family planning services, dental care, and mental health counseling. All community partners and PHN case managers receive training in interconception health protocols and motivational interviewing; they attend two-day Health Equity and Social Justice workshops and are given a Health Equity Toolkit: *Framing the Relationship between Race and Health*
http://www.accesskent.com/Health/HealthDepartment/HealthEquity/

Program Evaluation

Evaluation is done by comparing risk status and protective factors over the enrollment period, measuring changes in knowledge and/or behavior, and obtaining qualitative feedback from clients. KCHD epidemiology staff use birth certificate data from Vital Records to track subsequent birth outcome data and compare to previous birth data using paired t-test analysis.

Evidence

Women with a prior poor pregnancy outcome are 3-4 times more likely to have a subsequent adverse outcome than women with a healthy delivery. The risk of recurrence for PTB is 15% - 30%, and the risk of LBW is anywhere from two to twelve times higher. A pregnancy interval <18 months increases the risk of poor birth outcomes by 30% - 40%, and African American women are three times more likely to have an infant loss, preterm delivery or LBW birth. The IC program was designed to reduce the risk of these outcomes in a subsequent pregnancy.

The impetus for delivering the IC Program is supported by the Centers for Disease Control and Prevention (CDC) *Recommendations to Improve Preconception Health and Health Care*, which includes interconception care (http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5506a1.htm), as well as by the 2012 *Born Too Soon: The Global Action Report on Preterm Birth,* which recommends optimal child spacing and strengthening health services before and between pregnancies so mothers enter pregnancy as healthy as possible.

The IC program developed in Kent County is based on two successful models: 1) The Interconception Health Promotion Initiative in Denver, and 2) The Interpregnancy Care Program at Grady Memorial Hospital in Atlanta. These two programs were recommended by MDCH because of their evidence of positive outcomes and cost savings. The program we developed was declared a state model by MDCH and adopted by six other Michigan counties. As mentioned before, the IC program received a Promising Practice designation from NACCHO in 2012, and we are currently applying for Model Practice designation.

All program interventions and protocols are based on evidence that they contribute to improved birth outcomes. Poor nutrition, obesity, chronic disease, substance abuse, domestic violence, mental health issues, unintended pregnancy and racial inequities have all been linked to prematurity, LBW, and infant death.

Periodontal disease has been identified as a factor in low-weight and pre-term births. Most IC clients are covered through Medicaid insurance, yet the majority of clients receiving dental care have not had a dental visit in several years. Reducing the impact of periodontal disease on pregnancy outcomes is seem as a very cost-effective preventive measure to reduce the high future costs of care of low-weight and/or premature infants.

Enrollment and Outcomes (As of December 2012)

The initial MDCH funding for IC care was intended to reach a minimum of 25 high-risk women annually. The program has far exceeded its targeted caseload, and as of October 2013 has enrolled a total of 400

women, with 120 being served during 2012. Nearly one hundred women are enrolled at any one point in time, and current general fund dollars allow us to enroll an additional seventy women per year, but there is still a significant number of eligible women who are not enrolled due to funding limitations. In Kent County in 2011 there were 53 infant deaths, 36 stillbirths / fetal demise, and 1,453 LBW births, but only 70 of these were able to enroll in the IC program. With sufficient funds, we estimate we would be able to enroll many more eligible women who could benefit from the IC program. We realize not all eligible women would choose to participate, but with nearly 1,500 adverse pregnancy outcomes per year, at least several hundred more women could be served if sufficient funding were available.

Enrollment data for 2007 – 2012 show these are high-risk women:

- 46% African American, 19% Latina, 29% White
- 22% 15-19 years old, 56% 20-29, and 22% 30 years or older
- 74% high school or less
- 76% unmarried
- 74% unintended pregnancy
- 74% Medicaid
- 13% uninsured
- 51% had an acute infection
- 21% had a chronic disease
- 27% smoked during pregnancy
- 12% used alcohol during pregnancy
- 15% used marijuana during pregnancy
- 10% were victims of domestic violence
- 44% struggled with mental health issues
- 80% had not seen in dentist in more than 4 years

The IC Program has produced impressive outcomes. Data comparing selected birth outcomes for the clients who have had a birth since enrollment in the program indicates that of those clients discharged from the program due to a pregnancy, 63% had achieved ideal birth spacing of at least 18 months post delivery. Data for the sixty-one pregnancies subsequent to participation in the program show a statistically significant increase ($p<0.05$) in mean birth weight from 1,791 grams to 2,797 grams (an average gain of 2.3 lbs.). There was also a statistically significant increase ($p<0.05$) in mean gestational age among IC clients from 31.5 weeks during their eligible pregnancy outcome to 37 weeks during clients' subsequent births (an increase of 5.5 weeks gestational age).

Factor	***Birth Outcome Before IC*** *(n312)**	***Birth Outcome After IC*** *(n61)**
NICU admission	44.8%	12.1%
Ave. birth weight	3.9 lbs. (1791 gm.)	6.2 lbs. (2797 gm.)
Ave. Gestational Age at birth	31.5 weeks	37 weeks
Number infant deaths / stillbirths	25	0
Number fetal demise 20-37 weeks GA	8	0

* These are latest data as of December 2012, updated data from 2013 is currently being analyzed

One hundred sixteen clients received dental services through the IC program; 80% had gingivitis or advanced periodontitis, 85% had carious lesions, 42% had not seen a dentist in more than five years and several had never seen a dentist. Of the women who enrolled in the program, 100% had improvement in tissue health within three months (decreased bleeding, plaque, gingivitis), 94% showed improved oral hygiene practices and knowledge about oral health, and 98% reported lessened anxiety and improved self esteem.

Cost of prematurity / LBW

There are various calculations on the cost of prematurity. Some include only medical costs for the first year of life; others calculate longer term and societal costs. One of the more conservative figures is based on an average of all preterm births in the US. In 2005 the average first year medical costs, including both inpatient and outpatient care, were about ten times greater for preterm infants ($33,200) than for full term infants ($3, 325). (*Preterm Birth: Causes, Consequences and Prevention*, Institute of Medicine Report, 2006.)

In 2005 the annual societal economic burden associated with preterm birth in the United States was at least $26.2 billion, or $51,600 per infant born preterm. Medical care services contributed $16.9 billion to the total cost and maternal delivery costs contributed another $1.9 billion. In terms of longer-term expenditures, early intervention services cost an estimated $611 million, whereas special education services associated with a higher prevalence of four disabling conditions among premature infants added $1.1 billion. Finally, the committee estimates that lost household and labor market productivity associated with those disabilities contributed $5.7 billion.
http://www.ncbi.nlm.nih.gov/books/NBK11358/

According to the March of Dimes Foundation 2008 report, *The Cost of Prematurity to Employers*, the average expenditure for premature/LBW newborn care was $49,033, of which $46,004 was paid by health plans and $1,987 was out-of-pocket; in comparison, the cost for newborn care for full-term infants was $4,551. The average hospital stay for preterm/LBW infants was 14.2 days vs. 2.3 days for uncomplicated deliveries. The average number of outpatient visits and prescriptions were also significantly higher during the first twelve months of life. When maternal care costs are added, along with outpatient visits and prescriptions, the cost of a premature/LBW infant in the first year of life alone is $64,713 compared to $15,047 for a full-term infant (2005 costs adjusted to 2007 dollars).

In Maryland in 2007, the medical costs for a very low birth weight birth (<1500 gm or 3.3 lb) was 36 times higher than the cost of a normal weight birth (*Low-Birthweight Births Cost Maryland Millions*, Advocates for Children and Youth, Volume 6, Issue 18, February 2009).

Data specific to Michigan comes from the Center for Healthcare Research and Transformation: "**In 2007, the average charge for a premature birth/low birth weight delivery was $102,000 in Michigan** ($119,000 in the US), approximately 14 times higher than the average charge for a normal delivery. And the cost differential continues in the first year of life. Average first year costs for preterm children in 2008/9 for Blue Cross and Blue Shield of Michigan (BCBSM) were **$41,700** compared to $4,300 for children born at full term. Children born preterm with BCBSM represented 10.3 percent of total births but accounted for 52.6 percent of total spending for all children in the first year of life." (http://www.chrt.org/the-cost-of-prematurity, Nov. 22, 2010.) Given that the numbers quoted are from 2007, we can assume that the average cost for preterm births is even higher in 2012-2013.

As reported by the March of Dimes Perinatal Data Center in 1998: "The medical and social services that are required by low birthweight and very low birthweight infants are significant and the costs are high to society and the American taxpayer. Those babies that survive the first year incur medical bills averaging $93,800. First year expenses for the smallest survivors will average $273,900. Significant savings can accrue from enabling mothers to add a few ounces to a baby's weight before birth. An increase of 250 grams (about 1/2 pound) in birth weight saves an average of $12,000 to $16,000 in first year medical expenses. Prenatal interventions that result in a normal birth (over 2500 grams or 5.5 pounds) saves $59,700 in medical expenses in the infant's first year. The long-term cost of low birthweight infants includes re-hospitalization costs, many other medical and social service costs and, when the child enters school, often large special education expenses. These public expenses can go on for a lifetime (Rogowski, J. (1998) *Cost-effectiveness of Care for Very Low Birthweight Infants*. Pediatrics 012(1):35-43).

Pregnancy outcomes are important indicators of child survival and maternal health. They also have a significant impact throughout one's life. Low birth weight infants are at increased risk of long-term disability and impaired development, and are more likely than normal weight infants to experience delayed motor and social development. Lower birth weight also increases a child's likelihood of having a school-age learning disability, being enrolled in special education classes, having a lower IQ, and dropping out of high school. One study found that 26% of learning disabilities among school-age children are due to prematurity / LBW. Recent studies have also pointed to low-weight births as a strong predictor of adult health. Children born less than normal weight (>2500 grams) are significantly more likely as adults to suffer hypertension, type II diabetes, coronary heart disease, and have shortened lives.

A meta-analysis of fifteen research studies concluded that premature birth is associated with poorer health and social-emotional functioning measured at preschool age, in adolescence, and in young adulthood (Zwicker JG, Harris SR. Quality of life of formerly preterm and very low birth weight infants from preschool age to adulthood: A systematic review. *Pediatrics*. 2008; 121: e366–e376).

Potential Cost Savings

The costs for the IC Program are provided as per client reimbursements for providing case management, family planning, and dental services. The total cost per client is $952. This includes $365 for enrollment/case management, $135 for health items and FP incentives, $75 for wellness program expenses (including farmers' market coupons, blood pressure/ cholesterol screening and incentives); $200 (average per client) for contract dental services (provided by volunteer dentists), and $177 for a comprehensive FP exam and birth control for 12 months. The IC Program is administered through KCHD's Health Education and Promotion division. Primary staff responsibilities are managed by a .5 FTE program coordinator. When personnel costs are added in, the cost per client is approximately $1,300.

Considering that the average cost for a preterm / LBW birth in Michigan exceeds $100,000, with an additional $42,000 in medical costs during the first year of life, the potential cost savings are substantial. The savings would accrue to private insurance plans and to the state's Medicaid budget, resulting in additional dollars for the community health budget; families would also save out-of-pocket costs.

Aside from these immediate savings in health care costs, there are life-long savings from reducing physical and cognitive disabilities, improving academic performance, and preventing chronic disease.

Although this RFI addresses financial investments, the added psycho-social and emotional benefits of having healthy children to families and society are immeasurable and should not be ignored.

SUMMARY

The Kent County Interconception care program is an innovative approach that:

- Is holistic and responsive to client needs
- Includes psycho-social determinants and wrap-around services to overcome barriers to care
- Utilizes evidence-based protocols
- Offers a unique dental component
- Emphasizes pregnancy prevention and child spacing
- Addresses underlying issue of racial inequities
- Has demonstrated positive outcomes
- Has the potential for significant cost savings to Medicaid and private health plans

Bringing this model to scale in Kent County and throughout Michigan would fulfill the original intent of the eleven-county IC project that was funded by MDCH from 2005 to 2009, improve birth outcomes and reduce racial disparities, save money, and improve the health and wellbeing of our most vulnerable families. If expansion of this program proves successful, it could serve as a model to other states and regions.